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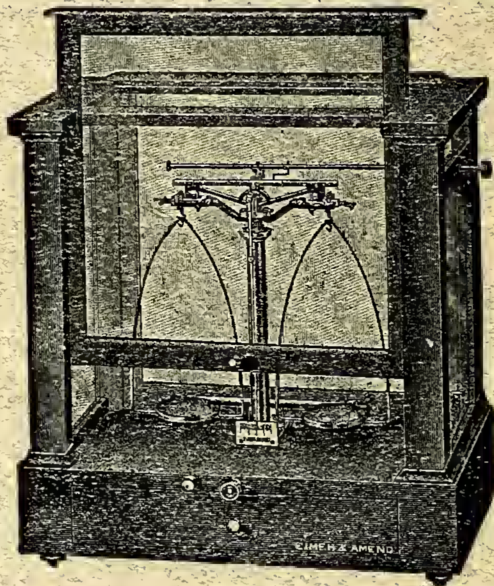
THE CAROLINA CHEMIST

"THE SPIRIT OF THE DEPARTMENT"

MAY, 1921



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The Carolina Chemist

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This year there are two Ph. D. men and eleven B. S. men going out into commercial work. At least that is where they wish to go but so far The Chemist has not heard of any of them having positions located and only two or three have positions in view. Whose fault is this? That of the men themselves, the alumni, or the faculty? We think that the fault lies partly in all three. But shouldn't we all get together and try to solve this problem?

Each year the condition exists and The Chemist has, time and again, asked for suggestions as to the solution. If we are to have Carolina men occupying important positions in the chemical world we must have a closer co-operation between the Department and the Alumni. Every man should be located before graduation. He should be able to approach commencement with the feeling that he is provided for when he leaves the protecting walls of Alma Mater. It is his just due and we have no right to deny him of it. Nor should we let it drop

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with finding a position for him; but instead keep the men informed of openings which may offer better opportunities and for which he may be better fitted. There is a field for great work in this line and THE CHEMIST stands ready to act as a go between in the deal. Think it over and let us have some suggestions.

Kistler, Lesh & Company, Tanneries, Morganton, N. C.

Tanning has come to be quite an industry in North Carolina in recent years and this articles will deal with the Burke Tannery of Morganton, North Carolina. This is one of the plants of Kistler, Lesh & Company and it is due to their kindness in furnishing us information that we are able to treat this subject in a detailed manner.

The tanning materials used consist principally of oak bark and chestnut wood extract. Both species of trees abound in Western North Carolina and freight charges are a very small part of the cost. About twenty tons of bark are ground each day for the leaches, and from fifty to seventy-five cords of chestnut wood are ground for the production of chestnut extract. Under normal running conditions the daily requirement of the plant is about ninety barrels of chestnut extract.

The hides used at this plant are mostly native packed steers and cows, but some South American hides are used also. Five hundred and eighty-four hides start into the process each day and after about four months in process, they come out as finished leather. The daily output amounts to from twenty thousand to thirty thousand pounds, including rough belting butts, the finished sole leather bends, bellies, and heads.

Among the various chemicals used in the process are: one car of burned lime every ten days, ten tons of sodium sulfide every year, six cars of sulphuric acid per year, three cars of tanners alkali, and nine hundred and sixty barrels of oil per year. The oil consists of one-fourth each wood oil, sulphonated cod oil, cod oil, and mineral oil. There are used for heating

the boilers from three to three and one-half cars of coal per week.

The by-products, such as grease, hair, spent bark, etc., are recovered and made use of or treated and sold. This prevents a great waste of materials and means greater profits for the company.

The company maintains a thoroughly equipped laboratory at Morganton which handles the chemical control and investigation work for the company. This includes the Burke Tannery, Burke Tanning Extract Plant, at Morganton, and for the two tanneries which the company owns in Pennsylvania, and also for a tannery in Michigan. Last year the laboratory handled nearly five thousand samples besides the various investigation and research problems that arise in connection with the various processes.

Aluminum Industry in North Carolina

(*Prepared by* MR. PARKS, *of the Tallassee Power Company, for* THE CAROLINA CHEMIST)

In 1758 Baron, a French chemist, stated that he "believed the base of alum to be of a metallic nature," and went on to predict that "a day would come when the metallic nature of the base of alum would be incontestably proven." From that time until 1827 the ablest minds devoted to scientific study wrestled with the problem of isolating this "metallic base of alum." Berzelius, Lavoisier, Sir Humphrey Davy with his battery of a thousand plates, and Oersted, along with many others, tackled the problem and some of them came very close to solving it as we now know by reading back over the record of their work. To Frederic Woehler belongs the credit for first isolating metallic aluminum. This he did by reducing anhydrous aluminum chloride with the use of metallic potassium as the reducing agent. He obtained a grey metallic powder which was an impure aluminum. He was unable to melt this powder, however, due probably to its impure state and it was 27 years later, in 1854, when De Ville obtained the metal in a nearly pure state and determined its metallic properties. Under De Ville's direction, after several years spent in perfecting the process for the manufacture of metallic sodium, the manufacture of aluminum from aluminum sodium chloride by means of metallic sodium was worked out. This method was used substantially as he perfected it until the present process was discovered. In 1886 Cowles began making aluminum bronze. His process was dependent on the reduction of aluminum by means of carbon in the presence of metallic copper in an electric furnace of the resistance type, and he was able to obtain an alloy containing up to 30% aluminum. His process, however, was limited to the production of alloy as it is impossible to reduce alumina by means of carbon except in the presence of an alloying material such as iron or copper. In 1886 a chemist by the name of Chas. M. Hall, while a student at Oberlin College and at that time 18 years old, discovered the process by which

aluminum is now manufactured. He applied for his patents in 1886 but they were not granted until 1889.

Hall's process is based on the electrolysis of a solution of alumina in a fused bath of cryolite. The bath is melted in a container lined with carbon which forms the cathode. The anode consists of a carbon electrode which conducts the electricity into the bath. Direct current at from 6-8 volts is required to electrolyze the alumina and furnish enough heat to keep the bath molten. The aluminum is deposited in a molten layer on the cathode and the oxygen released at the anode forms CO_2 which escapes. The cryolite which forms the electrolyte remains unchanged by the electrolysis. When several electrolytic furnaces are connected in series across the poles of a generator and the "anode effect" takes place, the voltage on the furnace in question rises at the expense of the others, giving a very convenient method of regulating the operation of the furnaces. A low voltage electric lamp is connected across each furnace so that when the anode effect takes place and the voltage rises this light shows bright, indicating that more alumina is required. The molten aluminum is tapped off at intervals and cast into pigs to facilitate handling.

In the same year that Mr. Hall made his discovery in this country, Heroult made exactly the same discovery entirely independently in France, and while Hall was putting his process on a commercial basis in this country, Heroult was doing the same thing in Europe. Hall first tried to get his process started at the Cowles Plant in Lockport, N. Y., but owing to some misunderstanding, withdrew from Lockport and the real start was made at Pittsburgh where he was able to interest some men in the enterprise. The first plant was operated with power generated from steam. In 1895 a somewhat larger plant was put in operation at Niagara Falls, using water power, and since then the growth of the company has been rapid. During the first few years a great many difficulties had to be overcome. A pure source of alumina had to be found. Pure carbons had to be obtained, and above all the public had to be educated to the uses to which aluminum could be put. As a general proposition in order to obtain pure aluminum it is necessary to have

a cheap source of power, pure carbon electrodes, alumina and cryolite.

Bauxite, the most important source of alumina, was discovered in France near Baux from which it derived its name. It was first found in this country in Georgia and Alabama, but later larger deposits were found in Arkansas, and now very large deposits have been located in British and Dutch Guiana in South America. Pure alumina is produced from bauxite by use of the Baeyer process, which consists essentially of absorbing the alumina from the bauxite under pressure in caustic solution and later precipitating the alumina from solution in the form of hydrated alumina. This precipitate is then washed free from soda and calcined. By this method an alumina is obtained which is over 99% pure. The carbon electrodes are manufactured from petroleum coke and coal tar pitch, both of these materials being very low in impurities and producing a carbon of upwards of 99½% purity. Cryolite was formerly obtained almost entirely from Greenland, where it occurs in natural state, although now a large proportion of the amount used is made artificially, the fluorine for this purpose being derived from fluorspar.

The question of a source of cheap power has always been uppermost in the minds of the men behind the manufacture of aluminum and all of the present producing plants are located near a source of water power. That is why an aluminum plant is located in North Carolina and the development of the water power plant on the Yadkin River at Badin is a piece of engineering work worthy of special mention. In the Fall of 1903 a company was organized to build a granite dam across the Yadkin River near Whitney. The idea at that time was to back the water up with this dam and then carry it in a canal along the bank of the river to a point about five miles below the dam into a forebay from which it would enter penstocks to be used in a power house situated on the edge of the river below. Work was under way on this project until some time in 1907 when it was abandoned and it was in 1912 that the development was again taken up by a French company with the idea of finishing it and using the power in the manufacture

of aluminum in this country. Work was nearly completed on the old dam and particularly on the canal, but later M. Heroult, who was interested in the French company, made a visit to this country and saw greater possibilities for power development in the placing of a dam some six miles below the Whitney location. It is understood that M. Heroult was very firm in his conviction that the lower location was the beter one and that it was wise to abandon all the work and money spent on the Whitney location and concentrate the company's entire efforts on the development of a dam at the present location; consequently, in October, 1912, work on the old Whitney dam was abandoned and a start was made toward the building of the dam at the present site. A considerable amount of work was done by the French company on the present site before the "great war" made it impossible for them to continue, and work was stopped in the Fall of 1914. In 1915 the present company bought out the French holdings and the present dam was finished in July, 1917. Later another dam was built about three miles further down the river at the location known as the Falls of the Yadkin.

In addition to the aluminum plant proper a plant has been erected for the production of carbon electrodes for use in the reduction process. The manufacture of carbon electrodes is a business in itself and the combination of these two plants makes Badin a very complete manufacturing establishment.

The company has built a model industrial town equipped with good houses, good schools, good water and all modern conveniences. A portion of the town has been set apart for the colored employees with equal advantages and a very contented community is the result. A very liberal wage policy has been adopted by the company and the men are able to see the opportunities which are open to those showing ambition and ability. This is particularly true of the young man who is looking for some line of endeavor with the idea of making it his life work, and the chemical and electro-chemical nature of the process makes it very attractive to the chemist and the chemical engineer.

Tungsten Incandescent Filament Lamps

By DUNCAN MACRAE, '09

The tungsten incandescent filament lamp industry is an important branch of the great electrical industry. In 1920, 200,000,000 lamps were manufactured in this country alone. This is approximately two lamps for every person in the United States, and the time is coming when practically every home will be lighted electrically. It is one of those industries in which difficult mechanical operations are carried out by remarkable automatic machinery. It is perhaps preeminently the product of painstaking and thorough scientific research. But it is of interest to chemists chiefly because of the unusual materials, conditions of temperature and pressure, and reaction involved in the manufacture and operation of the lamps.

Tungsten, the most important single material used in lamp manufacture, is scarcely mentioned in elementary text-books on chemistry and finds no place in the ordinary schemes of qualitative analysis. This is true in spite of its connection with the standard temperature scale, with the production of light, and Roentgen rays and with the development of high speed tool steels. Argon, used in the gas filled lamps, is marked by the fact that it is member of the group of inert gases whose discovery was such an addition to the Periodic Law. In the vacuum type lamp at pressures of a few millionths of an atmosphere, reactions take place between gas molecules at room temperature and the filament at 2100°, hydrogen is dissociated into atoms, and reaction rates may be studied quite apart from diffusion processes which control the velocities of reactions between solids and gases under ordinary pressure.

Tungsten is used as a lamp filament because it can be operated at a higher temperature than any other substance without evaporating, at such a rate as to excessively blacken the bulb or melting. The higher the temperature to which the filament can be heated the greater will be the proportion of the electrical energy supplied to the filament that will be radiated in the form of light. While it does not have so high a melting point as carbon, yet at the same temperature it does not

evaporate so rapidly and, therefore, is preferable to carbon. Tungsten at its melting point, 3403°C, would require only 0.2 of a watt to produce one candle power. In order to give a "life" of 1000 hours the filaments of commercial lamps are operated at temperatures requiring from 0.5 to 1.0 watts per candle (w. p. c.). These figures may be compared with 0.03 w. p. c., the mechanical equivalent of a good white light, and 0.02 w. p. c., the mechanical equivalent of light of the wave length to which the human eye is most sensitive.

The ores chiefly used for the production of metallic tungsten are Scheelite ($CaWO_4$) and Wolframite (Mn, Fe)WO_4). These are converted into Na_2WO_4 by fusion with Na_2CO_3 or treatment in an autoclave with a solution of NaOH. The Na_2WO_4 solution so obtained is treated with acid to precipitate tungstic acid WO_3. This is a lemon yellow powder and is the raw material purchased by some of the lamp companies. It is purified by dissolving in ammonium hydroxide, precipitating with acid and finally redissolving in ammonium hydroxide and evaporating to obtain crystals of ammonium tungstate ($(NH_4)_{10}W_{12}O_{41}$). The tungstic oxide resulting from heating this compound in the air is reduced with hydrogen and the resulting tungsten powder is used for the manufacture of the filament.

The preparation of argon from the atmosphere is largely a physical process, namely, liquefaction and fractional distallation. Nitrogen is used in place of argon in some of the very large gas filled lamps. Although it reacts with evaporating tungsten molecules to some extent it does not attack the filament.

The pressure attained in commercial vacuum type lamps on exhaust (about 30 millionths of an atmosphere) is still further improved, after sealing the lamp off, by the evaporization of a small amount of phosphorus in the lamp. This tends to remove any water vapor still remaining by converting part of it into P_2O_5 which absorbs the rest. It has also been shown recently that nitrogen will react with phosphorus under the action of the electric discharge between the parts of the filament. The action of this phosphorus together with the action of the filament itself is so effective that the pressure in the finished lamp is very nearly one millionth of an atmosphere, and becomes less on

continued "burning." At this pressure of one millionth of an atmosphere, there remains in a 200 cc lamp bulb about 10^{15} molecules of gas. So the space in a vacuum lamp is far from free of gas molecules, but as even this enormous number weighs only about 1 ten millionth of a gram, the possibility of harm to the lamp by chemical action on the filament, conduction of heat or electricity by the gas is practically negligible and nothing would be gained by a more perfect exhaust.

The effect of water vapor in the vacuum type lamp, even in very small quantities, is to hasten the blackening of the bulb. The explanation of this action given by Langmuir is very ingenious. In the first place it cannot be due to a simple chemical reaction for the amount of tungsten is more than equivalent to the hydrogen evolved. The tungsten reacts according to the following equation $W+3H_2O=WO_3+3H_2$, depositing the WO_3 on the bulb. The liberated hydrogen is dissociated by the filament and in the active monatomic form reduces the WO_3 to metal and sets free the water vapor in the lamp. This cycle, repeated over and over again, results in the transfer of the tungsten from the filament to the bulb at a more rapid rate than would evaporation alone.

A similar cycle of reactions resulting in the transfer of tungsten has been used to *prevent* blackening of the bulb. It is brought about by introducing compounds into the lamp that will evolve chlorine at very low pressures. This chlorine is also dissociated by the filament and activated so that it reacts with the tungsten deposited on the wall of the lamp. It forms a colorless chloride of tungsten that is volatile and on coming in contact with the hot filament decomposes, depositing the tungsten on the filament again. Compounds introduced into the lamp to retard blackening of the bulb in this or other ways are known in the industry as "getters."

A very recent development in the use of such substances—or rather in the theory of their use—has been made in Holland. Very stable chemical compounds, such as CaF_2 or NaCl, which are incapable of evolving a halogen in the lamp, have been found to be effective in preventing the blackening of a lamp. These substances are most effective when evaporated from the

filament onto the bulb walls. They form a layer on the glass about 70 molecules deep The tungsten atoms, traveling with high velocity from the tungsten filament, strike this layer of deposited salt and perhaps penetrate it to a slight extent and are held surrounded by the salt molecules so that they cannot form a coherent conducting metallic film which seems to be necessary for light absorption by metals.

The Collection and Sale of Medicinal Herbs and Plants in North Carolina

The collection and sale of medicinal herbs and plants in North Carolina is an industry, which though little known, is one of considerable importance. The Western section, comprising the mountainous districts, produces by far the largest amount of such herbs. Their method of collection and sale is rather an interesting one. The first step is from the farmers and country people generally to the country store keeper. From him they are sent to such wholesale dealers as Wallace Brothers of Statesville, J. Q. McGuire of Asheville, and F. & D. Forester of North Wilkesboro. Here the plants are sorted and dried, sacked and baled, and sent to the various manufacturing druggists and patent medicine concerns all over the country. An effort was made to obtain figures of production, but only an approximation of such production was obtained.

The amount handled annually by Wallace Brothers is approximately 1,500,000 pounds of crude herbs and plants. By far the largest part of these are sent to the manufacturers of patent and proprietary medicines. Figures of production of the more important products are here given: Wild Cherry Bark (Orunus Virginiana) 250,000 pounds; Sassafras (sariifolium) 150,000 pounds; Red Clover Blossoms (Trifolium pratense) 50,000 to 100,000 pounds; Black Haw (Viburnum decandra) 25,000 to 50,000 pounds; Jimson Weed (Datura Stromonium) 25,000 pounds; Lobelia (Lobelia inflata) 25,000 pounds. Figures as given on the smaller production of many others of great medicinal value vary from a few pounds to 10,000 pounds. Among these are:

Angelica Root.	
Balm Gilead Buds.	
Black Haw.	*Viburnum Prunifolium.*
Boneset.	*Eupatorium.*
Cohosh (black).	*Cimicifuga.*
Cranesbill Root.	*Geranium.*
Blackberry Root.	*Rubus.*
Dandelion Root.	*Teraxacum.*
Golden Seal.	*Hydrastis.*

Horehound.	*Marrabium.*
American Hellebore Root.	*Veratrum viride.*
Ladies Slipper Root.	*Cyprepedium.*
Mandrake or May Apple Root.	*Podophyllum.*
Blood Root.	*Sanguinaria.*
Peppermint.	*Mentha Piperata.*
Penny Royal.	*Hedcoma.*
Poke Root.	*Phytolacca.*
Sarsparilla.	*Sarsparilla.*
Senega Snakeroot.	*Polygala senega.*
Slippery Elm Bark.	*Ulmus Fulqua.*
Spearmint.	*Mentha viridis.*
Wabro Bark.	*Euonymus.*
Witch Hazel Bark.	*Hamamelidis cortex.*

Prices paid per pound for the more expensive plants include $7.50 for Gensing and Golden Seal, $1.50 for Senega Snakeroot, $2.00 for Balm of Gilead, buds, $1.30 for Lobelia, 50c for Black Snake Root, 65c for Black Haw and Jimson Weed and 30c for Pennyroyal, 40c for Poke Root, 25c for Wild Cherry Bark. Prices for the same product vary according to grade based on color, method of preparation for market and in some cases on size and shape.

Alumni Notes

Holmes Herty, Jr., B. S., '18, is a candidate for the M. S. in Industrial Chemistry degree at the Massachusetts Institute of Technology. He has recently been appointed assistant in chemical engineering and will be located at the Lackawanna Steel Plant Station in Buffalo, N. Y., until June, 1922.

B. Lacy Meredith, '18, writes the following from Iquique, Chile, S. A.: "This is the life. Nothing in this country is prohibited. A fellow does what he wants to do—in the way he wants to do it—both in work and play." We judge that Lacy is enjoying his work.

O. A. Pickett, B. S., '16, recently returned from the Pacific Coast after an inspection trip to the works laboratories of the Hercules Powder Co.

Among the men who have felt the call of a visit to the old Chem Building in the past year are the following: J. W. Turrentine, H. L. Crooke, H. G. Smith, F. R. Weaver, R. H. Souther, J. P. Sawyer, L. G. Marsh, J. S. Murray, and Ernest Neiman.

The following is a copy of a letter received by the Editor and we have hesitated to publish it as it may appear to be patting ourselves on the back; but we believe that it may give those of you who have gone out and failed to keep in touch with us something to think about. We hope that it will. The name of the writer has been withheld but it can be supplied upon request:

THE CAROLINA CHEMIST,
Chapel Hill, N. C.

Gentlemen:

I have your letter of January 10th, and note that you have sent me a bill for back dues covering 1919 and 1920 in adddition to that for 1921. In consequence, thereof, "get set for a bawling out." But remember that it is given good naturedly and with more of a smile than a frown.

On May 13, 1920, I wrote you a letter and enclosed my check to you for $10.00, and stated in the last paragraph of this letter that this was "for not only my back subscription, but a little extra." A few days later I received a letter under date of May 18, 1920, acknowledging the receipt of my check. This letter was signed by Mr. Ira W. Smithey.

In the light of the above facts I assure you that I do not owe you for back dues covering 1919 and 1920. What is the matter with the book-keeping of you boys? Isn't good book-keeping essential to a chemist? I think you will find that it is.

Understand that I am not objecting to giving you $3.00 for I certainly have that much interest in THE CAROLINA CHEMIST. In proof of that here is my check for $5.00. As long as you fellows continue to put out as good a paper as you are doing at present and continue to improve it, I am always willing to help you. And as to what I would like to see the paper grow to be, I will at this time only emphasize what I said in my letter of date referred to above.

The December 1920 copy of THE CAROLINA CHEMIST has just reached me, and, of course, it is full of things very interesting.

Wishing for you a year of successful growth, I am,

Yours sincerely,

We appreciate a letter like the above and while we do not expect nor do we want you to assume that much of our burdens we would like to be in a little closer co-operation with the alumni. An occasional letter telling us about yourself and your work, and occasional article for publication, and an occasional check for the year's subscription will help us out a great deal. Think it over and let's see if we can't get together on this proposition.

DIRECTORY OF THE GRADUATES OF THE DEPARTMENT OF CHEMISTRY AND A FEW OTHERS WHO MADE AN EXTENSIVE STUDY OF CHEMISTRY WHILE IN THE UNIVERSITY.

The directory has been revised and brought up to date as much as possible. Names with an asterisk are the last addresses available but from which mail was returned unclaimed. Those with a cross are addresses from which mail was not returned but from whom no directory material was received. We are reasonably certain that these addresses are correct. All others are absolutely correct according to data received from them. Any corrections will be appreciated by the editor.

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Alpha Chi Sigma

The year 1920-21 has been the most successful year in the history of Rho chapter of Alpha Chi Sigma. Its membership has been swelled from an average of about ten men to that of nineteen members. This is the largest membership that Rho has ever had.

The following men have recently been initiated: P. R. Dawson, Graduate; F. C. Cochran, E. D. Jennings, Juniors; J. C. Collins, G. R. Stout, L. V. Phillips, G. H. Leonard, and T. K. Thomas. Several smokers and an occasional dance have been given at the chapter house. On May 12, Founder's Day, the faculty were the guests of the house at an informal party.

The Library

The library is the recipient of a valuable collection of books and journals on Chemistry and Mining Engineering from Mrs. A. W. Belden, widow of the late A. W. Belden. Among these are the Transactions of the American Institute of Chemical Engineers, volumes one to nine. This set is one that the library has lacked for a long time and is a very valuable addition.

After much delay, all of the sets of German periodicals for the war period have now been completed with the exception of the following: "Monatshefte fur Cheme," "Chemisches Zentralblatt," "Chemiker Zeitung," and "Archiv Pharmozie." The missing parts of "Monatshefte fur Chemie" have been ordered and are supposedly on the way. Attempts are being made to complete the three years missing numbers of "Chemiker Zeitung." The completion of the "Chemisches Zentralblatt" is not now so important, due to the excellence of Chemical Abstracts. The price asked for "Archiv Pharmozie" is considered so exhorbitant as to delay ordering now.

We are pleased to announce that Professor Frank C. Vilbrandt will be a member of the Department next year. Professor Vilbrandt comes to us as Associate Professor of Industrial Chemistry, a position which was provided for last year but which the Department was unable to find a suitable man to fill. Professor Vilbrandt has formerly been a member of the faculty of the Ohio State College. It is expected that he will take over the courses in Industrial Chemistry and technical analysis and will also give a seminar course and direct some research in Industrial problems. We feel that this is a decided step forward and are glad to welcome Professor Vilbrandt.

The High School Department

THE SECOND ANNUAL SCHOLARSHIP EXAMINATION

We are pleased to announce that in the second annual scholarship examination Mr. Rex Sink of Winston-Salem High School was the winner. Mr. Hazel Zealy of Goldsboro High School took second place, and Miss Leta Shields of Greensboro High School carried off third place. We wish to offer our heartiest congratulations to the winners and hope that we shall have the pleasure of following a successful chemical career through college.

WHAT IS YOUR CAREER TO BE?

Doubtless many of you are now considering what your life work shall be and where to best secure the proper training for it. Allow us to suggest that of a chemist and the University of North Carolina as the proper place for your training. When it is remembered that after a period of depression always comes one of increased activity, now is a very opportune time to start upon ones training as a chemist, either for the teaching profession, pure scientific work, or industrial work. The University offers every facility for chemical training, having at its disposal a well trained faculty, well-equipped laboratories, and an excellent library for reference work. We think that you would do well to consider the chemical profession and assure you that a very hearty welcome will await you at the University next September.

Chemical Fun

Ques. How do you tell when chloroform is old?

Answer. If chloroform is left exposed to the air or light it evaporates and decomposes. Tell by odor. Test for the COH group by finding the specific gravity and then you can tell.

Formaldehyde is made from wood pulp by boiling with alcoholic potash.

It has been suggested that the following might apply to Dooley's Kelp Oil:

Bubble, bubble, little tar
How I wonder what you are,
If I knew I'd famous be,
Won't you crystallize for me?

—*Cornell Chemist.*

"IT'S ALWAYS THE UNEXPECTED THAT HAPPENS IN CHEMISTRY"

"What do you get when you shake benzene with sodium carbonate for twenty-four hours at zero degrees C?"

The Lad on the Front Seat—Awfully tired.

—*Cornell Chemist.*

THAT CHEMICAL DINNER

By T. SWAN HARDING

Whereat Ethyl Alcohol was hostess, and there were present besides: Cassie Role, Addie Noid, Sal Icilate, Al Uminum, Mol Ybdic, Mag Nesium, Mollie Kule, Ethyl Acetate, Arthur Mometer, Al Cohol, Si Lose, Pete Roleum.

And the table was tastefully decorated with Flowers of Sulphur. Here it was that Copper Sulphate kept order while the guests regaled themselves on: Bacto Beef Broth, Asparagin, Liver of Sulphur, Sugar of Lead, Milk of Lime, Alumina Cream, Dichloramine Tea, and other delicacies which resulted in general call for Salts and an application of Plaster of Paris.—*The Chemist Analyst.*